Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

Starkey Laboratories, Inc. and
Micro Ear Technology, Inc.

ET Docket No. 09-38

Request for Waiver of
Section 15.247(a)(2)
of the Commission's Rules

REPLY COMMENTS OF STARKEY LABORATORIES, INC. AND MICRO EAR TECHNOLOGY, INC.

Starkey Laboratories, Inc., and its wholly-owned subsidiary, Micro Ear Technology, Inc. (hereinafter referred to collectively as "Starkey Laboratories") replies to comments filed in response to Starkey Laboratories' Amended Request for Waiver of Section 15.247(a)(2) of the Commission's rules ("Starkey Waiver Request"). Starkey Laboratories has asked for a temporary waiver of Section 15.247(a)(2)[1] so that it may operate low power RF communications devices ("low power devices") with a narrower 6 dB bandwidth of 100 kHz instead of the 500 kHz required by the rule. Granting the waiver would enable Starkey to expeditiously roll out low power devices which would greatly enhance the hearing disabled patients' quality of life, make for better and more efficient use of bandwidth, and not cause any harmful interference with other users of the relevant spectrum.

I. STARKEY WAIVER REQUEST

Starkey Laboratories is an industry leader in hearing instrument manufacturing, creating top quality diagnostic equipment, hearing protection products, wireless technology and unique hearing solutions for every environment. It is interested in facilitating wireless assisted listening,

[1] Starkey Laboratories also filed a separate Petition for Rulemaking asking the Commission to amend Section 15.247(a)(2)'s minimum bandwidth requirements. The Office of Engineering and Technology has separately sought public comment on the Petition in DA 09-676, RM-11523.

hearing enhancement, and configuration of hearing instruments for the hearing impaired; and has made a significant investment in low power devices in the 902 to 928 MHz ISM band. Among the devices that Starkey intends to use in the band are: assistive listening devices ("ALDs") for sending digital audio information to a hearing aid wearer for the purpose of improving the signal to noise ratio of audio information presented in a classroom and other public venues; wireless devices for transmitting public service announcements and alarms to hearing instruments; hearing assistance devices to permit two-way digital audio communication and related control; and programming devices for configuration and maintenance of hearing instruments. Starkey Waiver Request at 2-3. All of these devices would greatly enhance the overall quality of life of Americans with hearing impairments.

Starkey Laboratories determined that operating these low power devices within the present requirements of Section 15.249 of the Commission's rules has several technical limitations. It also determined that operating the low power devices in the 217 MHz band allocated for hearing assistance devices would require modifications and/or changes of various Commission rules. *Id.* at 4-5.

Because of these limitations, Starkey Laboratories asked for a waiver to operate the low power devices within Section 15.247(a)(2) with a narrower 6 dB bandwidth of 100 kHz instead of the 500 kHz required by the rule, while maintaining the 8 dBm/3 kHz power spectral density specified in Section 15.247(e). There is good cause to grant the waiver. Grant of the waiver would not cause harmful interference because: 1) Starkey Laboratories already employs listen before talk ("LBT") and other technologies, and the low power devices, such as ALDs, would thus avoid harmful interference from other wireless systems and minimize interference to other wireless devices; 2) the low power devices would use a narrower bandwidth and actually reduce

potential interference; and 3) Starkey's experiments and field tests have found no harmful or unexpected effects. *Id.* at 6-7.

Moreover, Starkey's Waiver Request is in the public interest. If granted, it would enhance hearing disabled patients' overall quality of life. The over thirty-one million Americans with hearing problems face challenges on a daily basis. Many custom hearing aid wearers may have difficulties understanding speech in public places, including airports, train stations and theaters; poor signal to noise ratio may make it difficult to understand public announcements; the range on in-home ALDs are often limited to line of sight or same room usage; and most current communication interfaces require equipment that highlight the patient's disability. Grant of the waiver would enable Starkey to expeditiously roll out low power devices that would permit custom hearing aid wearers to be better and more seamlessly connected in various settings. *Id.* at 7-8.

Starkey's Waiver Request is supported by Williams Sound ("Williams"), an industry leader in hearing assistance technology for over 33 years, by Zarlink Semiconductor ("Zarlink"), a leading provider of integrated circuits for medical applications including hearing aids for over 30 years, by ON Semiconductor ("ON"), a leading supplier of silicon solutions to the hearing aid industry and by Pulse Nederland BV ("Pulse"). Williams and Zarlink support the Waiver Request in part because of the public interest benefits of "implementing digital ALD transmissions" and to "better support the use of low power transmitters for hearing aids and other applications...and valuable improvements for the end-user..." Williams Letter at 2, Zarlink Letter. ON supports the Waiver Request because it "is an appropriate option for bringing the benefits of wireless hearing aids to hearing aid users in the US." ON Letter at 2. Williams,

Zarlink and Pulse also support the Waiver Request because it would make for better and more efficient use of bandwidth. *Id.*; Pulse Comment.

II. ITRON'S CLAIMS OPPOSING THE WAIVER REQUEST ARE UNSUPPORTED

Only one party, Itron, Inc. ("Itron"), filed comments specifically opposing the Waiver Request.[2] Itron, a manufacturer of automatic meter reading and metering infrastructure, argues that granting the waiver would undermine the purposes of the rule and open the door to "ubiquitous deployment of unlimited numbers of devices that would interfere with the Commission's efforts to rationalize coexistence among many disparate uses...." Itron Comments at 1. Itron also suggests that Starkey should instead operate the low power devices in the 217 MHz allocation for hearing assisted devices. *Id.*

Itron's claims are hyperbolic, off the mark and in conflict with its own statement that the Part 15 rules were crafted to balance the needs of many types of users, "allowing hundreds of millions of varied-types of unlicensed devices to coexist." *Id.* at 3. The waiver Starkey seeks would allow for other types of unlicensed devices envisioned by Part 15 rules, and at that, devices that are clearly in the public interest. And notwithstanding Itron's claims, the waiver would make for the better and more efficient use of spectrum and not cause harmful interference or disruption. Starkey Laboratories further addresses Itron's claims as follows.

A. The Waiver Would Not Undermine the Purposes of the Rule

Itron claims that the waiver "would undercut the purpose underlying the rule." *Id.* at 4. Section 15.247 currently specifies a power spectral density of 8 dBm/3 kHz but only for those users occupying >500 kHz of bandwidth. Itron states that "the rule establishes higher than

[2] Warren Havens, Skybridge Spectrum Foundation, Telesarurus Holdings and other entities filed joint comments ("Havens Comments"), in which they did not specifically oppose the Waiver Request, but in which they asked that any such request or rule change be subject "to another public notice" and made part of the ongoing proceeding regarding the rules governing M-LMS, Docket 06-49. Starkey does not agree that its Waiver Request needs to be, or should be, considered in the context of Docket 06-49 or any of the other proceedings described in the Havens Comments.

normal power limits for Part 15 devices that have less interference potential, and are less susceptible to interference, because they spread their energy over a wider bandwidth." *Id.*

Spreading RF energy over a wider bandwidth, however, does not in itself produce less interference. By specifying a minimum bandwidth of 500 kHz over which to spread RF energy, the current rule has the effect of encouraging users who want to use this power spectral density requirement to increase their occupied bandwidth, thus increasing potential interference. Reducing this minimum bandwidth requirement would instead encourage the use of less bandwidth and thus lower the total transmitted power when less bandwidth is required.

In addition, spreading techniques, such as direct sequence spread spectrum and frequency hopping, are but two approaches to reducing susceptibility to interference. These are brute force approaches to the problem of susceptibility. There are other modern techniques available, such as adaptive frequency hopping and adaptive frequency selection, that are better approaches to not only limiting susceptibility, but also to reducing unwanted interference.

B. The Waiver is in the Spirit of the Commissions' Part 15 Rules

Itron claims Starkey's Waiver Request "would open the door to ubiquitous deployment of unlimited numbers of devices that would interfere with the Commission's efforts to rationalize coexistence among many disparate uses of the 902-928 MHz band." *Id.* at 1. To the contrary, Starkey believes that the waiver is in the spirit of the Commission's efforts to rationalize the use and encourage the commercial use of the 902 to 928 MHz band in such a way so as to maximize usage while minimizing interference. As Itron itself posed, Part 15 Rules allow for "hundreds of millions of varied-types of unlicensed devices to coexist." *Id.* at 3.

Itron states, however, that the Commission, in its Spectrum Etiquette FNPRM, noted that there appears to be a potential for a "digitally modulated device . . . to essentially occupy the

entire 915 MHz band,"[3] and that granting Starkey's Waiver Request would exacerbate this by "raising the prospect of flooding the market with large numbers of ubiquitously deployed devices operating virtually non-stop." Itron Comments at 5. Even if these claims were true, which they are not, Part 15 already allows for hundreds of millions of varied types of unlicensed devices to coexist. In addition, Starkey's Waiver Request asks the Commission to allow devices that occupy a narrower bandwidth than the current bandwidth minimum required under Section 15.247.

Itron's depictions of Starkey's intended low power devices are wildly exaggerated and off the mark. While Starkey is planning a variety of ALDs and other devices, *supra* at page 2, the devices would be used in particular settings and venues and certainly not 24/7, and not "virtually non-stop" as Itron claims. For example, devices to be used in classrooms or theater settings would be used during class times and or performances, and configuration devices would be limited to doctor or health provider/technical patient visits.

Also, while Starkey supports the Commission's examination of whether it should adopt "rules of etiquette" to be used in the ISM bands, Starkey reiterates that it is already using one such technique -- listen before talk ("LBT") prior to transmitting. Starkey would use this and other spectrum etiquette techniques in operating the low power devices it seeks to use if granted the waiver.

LBT limits the harmful interference in this band from relatively high power transmitters. In addition, Starkey has implemented adaptive frequency selection techniques to limit susceptibility to interference. It should be noted that very low power devices such as hearing aids would not necessarily use LBT since their output power is limited to -25 dBm ERP due to

[3] *Id.* at 5, citing ¶ 19 of *In the Matter of Modification of Parts 2 and 15 of the Commission's Rules for Unlicensed Devices and Equipment Approval*, Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, 22 FCC Rcd 11383, ET Docket No. 03-201 (rel. June 22, 2007).

the size constraints of the antennas and the power capacity of the batteries used in hearing devices. The assistive listening devices and configuration devices covered by the Waiver Request will employ such LBT and adaptive frequency selection techniques.

Itron further claims that Starkey's proposals would "place no limit on the duty cycle of its devices, and the devices would operate over a considerable distance." Itron comments at 6.[4] Starkey, however, does not foresee the use of assistive listening devices and configuration devices in an outdoor setting. In addition, Starkey will not operate said devices with no constraints on their duty cycle. As stated earlier, Starkey will employ LBT and adaptive frequency selection techniques to both avoid interference and prevent unwanted interference to other wireless services. In sum, granting the waiver is in the spirit of the Commission's efforts to rationalize coexistence of the multiple uses of the band.

C. Operating in The 217 MHz is Impracticable

Finally, Itron suggests that Starkey should operate the lower power devices in the bands already allocated for use by hearing assisted devices. *Id.* at 7. However, as Starkey stated in its Amended Request for Waiver, effectively operating in such a band – the 1 MHz centered at 217 MHz - would require extensive rule changes and modifications. Starkey Amended Waiver Request at 4-5. The current rules have the following limitations for the assistive listening devices and configuration devices envisioned by Starkey:

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[4] Itron also states that Starkey's Waiver Request is broad in scope because it would place no limit on the number of devices to be operated. Itron appears to suggest that because other waivers of Section 15.247, such as the waiver allowed in *Remington Arms Company, Inc.* have been limited to a certain group of users and otherwise restricted, that Starkey's Waiver Request should fail because it might benefit broad numbers of users. Itron Comments n.14 (citing *Remington Arms Company, Inc., Request for a Waiver of the Part 15 Regulations,* Order, 20 FCC Rcd 18,724 (2005)). The waiver standard, however, is not governed by whether the waiver has broad or narrow consequences. The waiver standard is clear – a waiver may be granted if a grant would serve the public interest without undermining the policy of the rule. *See WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969), *aff'd*, 459 F.2d 1203 (D.C. Cir.), *cert. denied,* 409 U.S. 1027 (1972).

1. Limit the total amount of bandwidth to 1 MHz;

2. Channel allocation for standard channels is limited to 25 kHz maximum;

3. Transmission is limited to one way; and

4. Operation within 30 Km of certain VHF TV transmitters makes reception impossible at 217 MHz, given the current power spectral mask requirements for VHF TV transmitters.

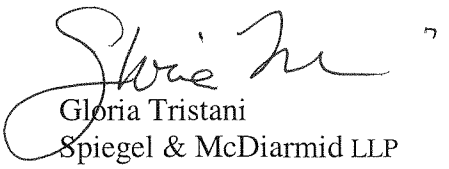
Operating the envisioned devices in this band would entail, at a minimum, the following modifications and/or rule changes: 3 MHz total bandwidth; increase the occupied bandwidth up to 300 kHz; allow two-way voice and data communication; and maximum power spectral density of = 6 dBM/10 kHz. *Id.* at 5.

III. THE COMMISSION SHOULD GRANT THE WAIVER REQUEST

The Commission should grant Starkey's Waiver Request. Itron's claims that granting the waiver would undermine the rule and interfere with the Commission's efforts to rationalize the shared use of the band are unsupported. Granting the waiver would not undermine the purposes of the rule and produce harmful interference but, to the contrary, it would minimize interference and make for the better and more efficient use of the band. Granting the waiver is well in the spirit of the Commission's Part 15 rules and its efforts to encourage the commercial use of the 902 to 928 MHz band to maximize usage while minimizing interference. Also, and as stated above, operating in the 217 MHz is impracticable and would require extensive rule changes and modifications.

More importantly, granting the waiver is in the public interest as it would expeditiously enhance the overall quality of life of hearing disabled patients. For the above reasons, the Commission should grant the waiver.

Respectfully submitted,



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